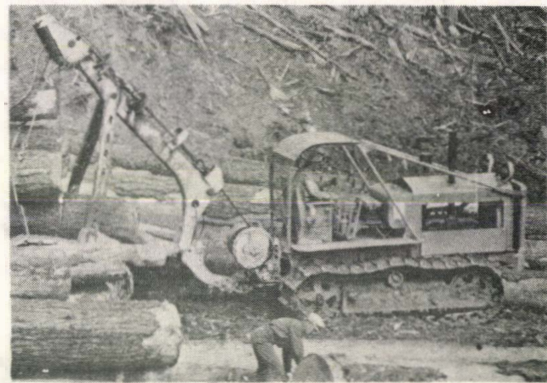
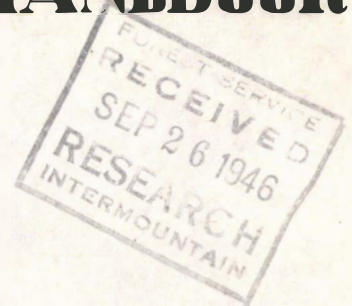


# NORTHEASTERN LOGGERS' HANDBOOK

by

Fred C. Simmons  
PRELIMINARY REVIEW EDITION



*Easier and Safer Work*



*Greater Production (more pay) and Better Living Conditions*

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## SECTION II:— SKIDDING WITH TRACTORS

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NORTHEASTERN FOREST  
EXPERIMENT STATION



United States Department of Agriculture

FOREST SERVICE  
NORTHEASTERN FOREST EXPERIMENT STATION

614 Bankers Securities Building  
Philadelphia 7, Pennsylvania

V. L. HARPER, DIRECTOR

FOREST UTILIZATION SERVICE  
James C. Rettie, Chief

If you want to be a mechanic, you will easily find plenty of good books which will tell you what you need to know. You will also find plenty of instructors and training shops.

What about the young man who wants to make his living by logging? For him there is no good source of information to which he can turn. The books and courses on logging are for the logging engineers--not for the fellow who uses the axe and crosscut.

Why shouldn't there be a simple illustrated handbook which will tell the young woodsman (or the green woodsman) what he needs to know about the care and use of his tools and the best of the old and the new techniques of, and devices for logging? He needs to know the "tricks of the trade" as much as anyone.

We hope that these pages, together with other short papers like it, will finally be put together in a printed NORTHEASTERN LOGGERS' HANDBOOK. We are putting it out in this form first because there seems to be an urgent need for this sort of information; and because we need the help and advice of persons who know about logging in our region before printing. We want the experienced logger to tell us what important things we have missed and where our advice is not good. We want the young man going into the woods for the first time to tell us what parts of it he finds hard to understand, to suggest how it can be made more useful to him. We would like the equipment manufacturers to check our recommendations for use of their products and tell us about new devices they are developing.

Please send criticisms, questions and suggestions to: The Director, Northeastern Forest Experiment Station, 614 Bankers Securities Building, Philadelphia 7, Penna. Additional copies of this and other publications in this series can be obtained from the same address.



## SECTION 11: SKIDDING WITH TRACTORS

By Fred C. Simmons \*

Wartime shortages of woods labor coupled with the urgent need to increase or maintain the production of forest products have greatly extended the use of tractors on Northeastern logging jobs. It seems quite certain that this trend will continue. The operators have now acquired experience in how to use the machines. The tractors and the special equipment used with them are steadily being improved to give better and more economical service.

There are some important economic limitations on the use of tractors. Their purchase involves a heavier capital investment than would be necessary for horse logging. Fairly continuous employment of the equipment is very desirable in order that the logging operator can recover his investment before his equipment is obsolete. This implies that he should have fairly large jobs in the heavier stands of timber. The skilled men required for the operation and maintenance of the tractors command better wages than teamsters have received. Other labor costs should be about the same. On the other hand, the tractor can be cheaply stored during periods of idleness. It does not have to be fed when it is not working.

The use of greater power in skidding heavier loads has, in many instances, caused serious damage to the remaining young trees. This disadvantage can, however, be overcome if tractor operators are required to exercise reasonable care.

### Types of Tractor Most Suitable for Logging

The crawler type of tractor is usually preferred for woods work. The large area of track in contact with the ground gives better traction on almost any kind of surface, including snow, ice and mud. The low center of gravity makes it possible to operate the machine without danger on moderately steep slopes.

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\* Specialist on Logging and Primary Processing

Crawler type tractors are available in a wide range of weight and horsepower. New and improved postwar models will, no doubt, be forthcoming soon. For this reason, present information on the range of weight and horsepower may soon be out of date. Up until now the smallest crawler type tractor in commercial production has a 17 horsepower gasoline motor and weighs about 3,100 pounds. The smallest diesel-powered machine has a 25 horsepower motor and weighs 6,800 pounds. The medium weight models have both gasoline and diesel motors developing from 40 to 70 horsepower. They range in weight from about 9,000 to 16,000 pounds. The heavyweight tractors weigh in the neighborhood of 20,000 pounds and have gasoline or diesel motors which develop between 85 and 150 horsepower. The diesel motor has rapidly been gaining preference - particularly in the bigger machines. Diesel fuel is cheaper, and diesel motors are sturdy and powerful.

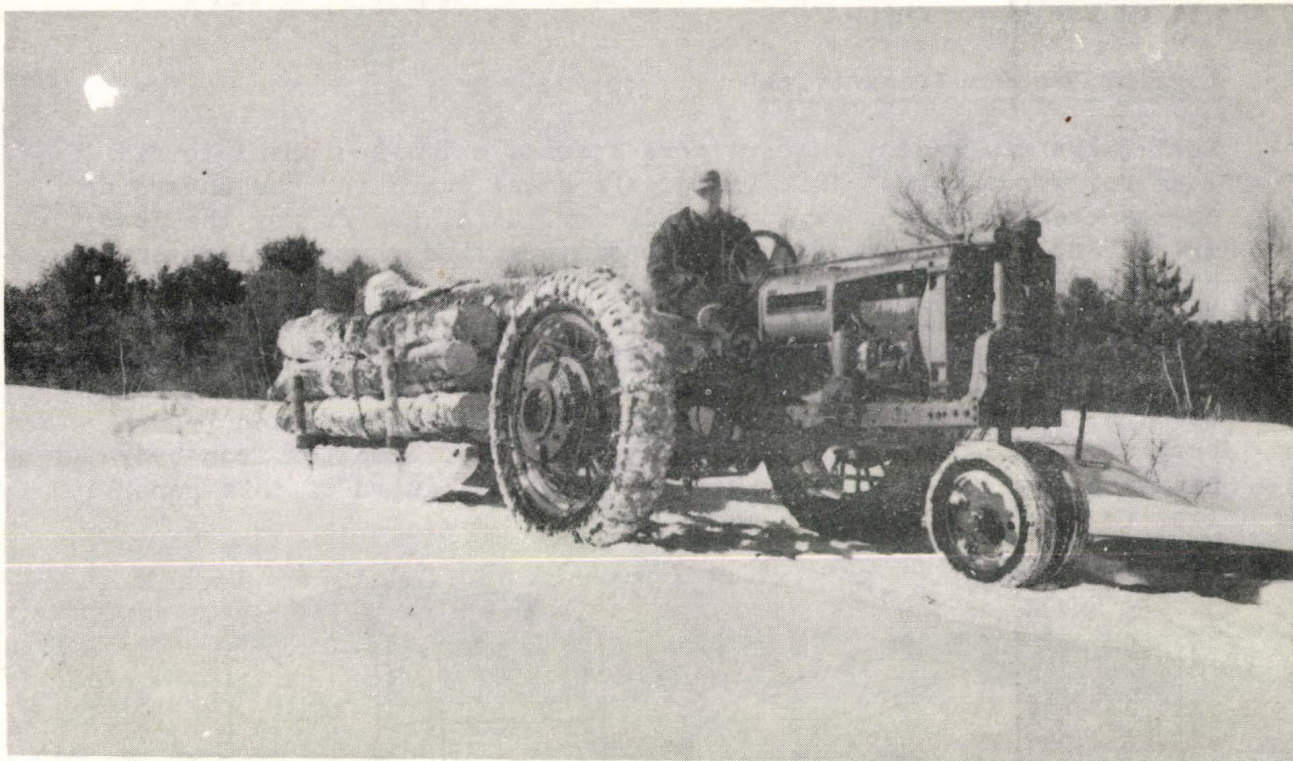
"Light" and "medium weight" tractor models are most suitable to Northeastern logging conditions. "Heavyweight" and "extra heavy" models are used here chiefly for roadbuilding and other bulldozer work. The lightest models cost from \$1,500 to \$2,000 and the medium weight machines from \$2,500 to \$4,500. Light equipment, on the bigger jobs, is used in the woods for bunching loads to be skidded by the medium heavy machines which handle loads up to two cords or 2,000 board feet over distances up to half a mile.

Each of the several manufacturers of crawler type tractors has developed some special features. Some diesel motors are started by small auxiliary gasoline motors and others by electric starters. Several makes have a steering mechanism which gives independent control of the two tracks which enables the operator to turn the machine in its own length. One make has a steering mechanism which makes use of a differential. It will not turn quite so sharply, but, on the other hand, is claimed to be easier on the track and clutches. Still other mechanical differences will be called to the attention of the prospective buyer. He should, of course, consider all of them, but more important than most of these is whether or not the manufacturer has a wide-awake and well equipped local dealer who can supply parts and service on short notice. Ordinarily it is better to build up a fleet of tractors of one make rather than to have a variety of makes and models. It will be much easier to get good service on parts and maintenance.

The above discussion of crawler type tractors does not imply that wheeled tractors have no place in the woods. This type does have its place, particularly on fairly level farm woodlands where skidding can be done during the time that ground conditions are favorable.



Some of the new types of pneumatic tractor tires with cleated treads give remarkably good traction even in mud and snow.



### SKIDDING WITH WHEEL TRACTOR

The wheeled tractor is usually less expensive to purchase and cheaper to maintain. If shod with rubber tires, it can be moved on highways under its own power. This is often quite important in logging farm woodlots.

A law enacted by the State of Nebraska in 1919 required that a stock model of each type of tractor offered for sale in that state should be given certain power efficiency tests by the Department of Agricultural Engineering of the University of Nebraska. Since that time, these tests have acquired a nationwide reputation. The results are quoted in the advertising literature of several manufacturers. On the basis of this information it is possible to make certain comparisons between makes and also between the various models of the same make. 1/

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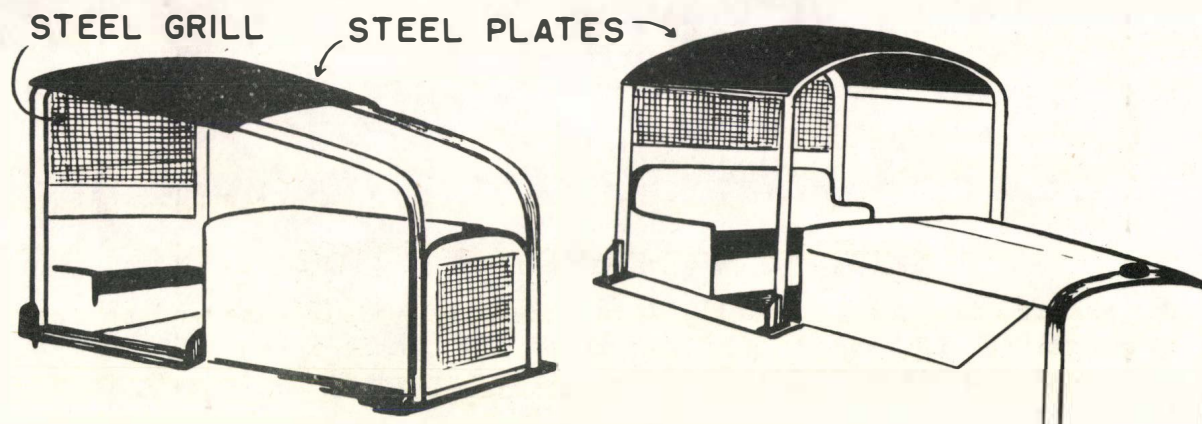
1/ A summary of these test data has been published in Bulletin No. 338, The Nebraska Tractor Tests, 1920-1941. Agricultural Experiment Station, Univ. of Nebraska, Lincoln, Nebraska. pp. 51 + table, Jan. 1942. Later and current test data are also available.



The test data include a check of drawbar and of belt horsepower, fuel and oil consumption and of the manufacturer's specifications and claims for his machine.

### Logging Tractor Accessories

Most makes of tractor require some special extra equipment to fit them for woods work. This includes a steel guard for the underside of the crankcase, a heavy duty radiator guard, guards for the lower tracks and wheel bearings. Many operators find that a bulldozer blade mounted on the front of the machine will readily pay for itself in road construction and by making it possible for the tractor to plow its way into otherwise inaccessible places. If the dozer blade is not mounted, the woods tractor needs a heavy front bumper. The operator also needs protection from falling tree limbs and from breaking cables. Two guards which give this protection from overhead and from the rear are sketched below. A guard of this general type is required by law in some states.



GUARDS FOR TRACTOR OPERATORS



### SKELETON TRACK SHOES

For winter use, a skeleton track with a hole about 4 by 6 inches in the center of each track plate helps to keep the snow from packing on the

There is no agreement among Northeastern operators as to the best pattern of track shoe and grouser for woods operations. There is more complaint about this part of the tractor than any other. For most purposes, operators want a heat-treated one-piece shoe as wide as can safely be carried on the sprockets. For the smaller machines this maximum width is about 12 inches; for the medium weight models it is about 16 inches.

tracks. The standard grouser has a blunt riser only about an inch high. For winter work, it is possible to obtain special ice grousers which are higher and sharper. These either replace the dirt grousers or bolt on over them. Some operators favor the ice grousers and others feel that they are not worth their cost. Experiments are now being made with rubber-shod tracks for woods work.

Auxiliary equipment for tractor logging is discussed later, but one item, the winch, has become so commonly used that it might be considered an integral part of the logging tractor. It is essential for all arch skidding and highly useful for ground skidding. When the machine becomes stalled on a steep pitch or on muddy or rocky ground, the driver releases the winch and moves ahead while the load lies still and the tow cable is paid out. When he reaches better ground, he puts the winch in gear and reels the load forward to the tractor. In this way he can apply two or three times the pulling power that was available at the drawbar. The winch is also used for bunching the load and for pulling logs out of inaccessible places.



HAULING LOG OUT OF MUDHOLE



### Types of Winches

For logging service a gear driven towing and hoisting winch is most useful. Worm driven winches develop tremendous power but they pay out and haul in the line more slowly, and heat up in continuous service.

A number of concerns specialize in making winches for logging service with crawler tractors. Desirable features of these logging winches include a design that hugs the back of the tractor closely, thus avoiding possibility of unbalancing it in use; a completely enclosed and positively acting brake; and heavy, accurately cut, and silent gears enclosed in a sturdy case, all of special analysis high-strength steels. Controls for logging winches are located in front or at the side of the driver's seat.

The various manufacturers, of course, offer their own special features in logging winches. One make has a brake that can be pre-set while reeling in a load, and which goes into action whenever the forward motion is stopped. A special offset winch is available, upon which one layer of wire rope will wind smoothly, with the end always in the center of the rear of the tractor. One maker features a reverse speed 50% faster than the reeling-in speed. A real logging winch, manufactured to Forest Service specifications, has recently been put on the market for light wheeled or crawler tractors (less than 20 hp).

### Ground Skidding with Tractors

Tractors are often used, in the same way as horses, for skidding logs on the ground. The same auxiliary equipment is frequently used. This includes the skidding chains, grab hooks, slip hooks, orotah grabs and skidding tongs discussed in the section, "Skidding With Horses". Tractors are also used to some extent for skidding with yarding sleds, bummers and scoots.



TRAILING LOGS



SKIDDING WITH SCOOT



Most operators who have tried it report that skidding on the ground behind tractors should not be done for distances over 500 feet. For longer skids some sort of antifriction device pays for itself rapidly in the larger loads and greater speeds that can be attained. For the short skids, and numerous turn-arounds, the greater maneuverability of the tractor without a trailing device pays out.

The various operations in ground skidding with a tractor are usually the same as those employed in horse skidding. The machine is driven near the front end of the load, turned around with the drawbar facing it, the skidding chain is wrapped around the end of the log or logs and then hooked onto the tractor drawbar. The load is then ready to be on its way.

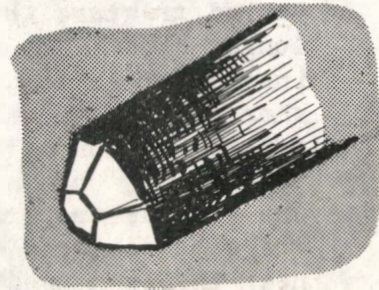
Ordinarily the tractor does not need much of a skidding trail. Too often, however, the drivers have been very careless about tearing up the ground and riding down young trees. This should certainly be avoided as much as possible. By use of the winch with 60 or 75 feet of wire rope, the operator can reach into thick brush, into rocky areas and into depressions to pull out logs without taking his machine in there. This often saves much time and conserves some timber that might otherwise be destroyed.



GROUND SKIDDING



In all ground skidding the front ends of the logs or poles dig into the ground, which greatly increases the horsepower needed to pull them. With the entire log length dragging on the ground it often becomes covered with embedded dirt and gravel. Some operators "snipe" the front ends of the bigger logs with an axe to make them pull easier. If this is done on the butt end very little loss of lumber will be involved.



SNIPED LOG

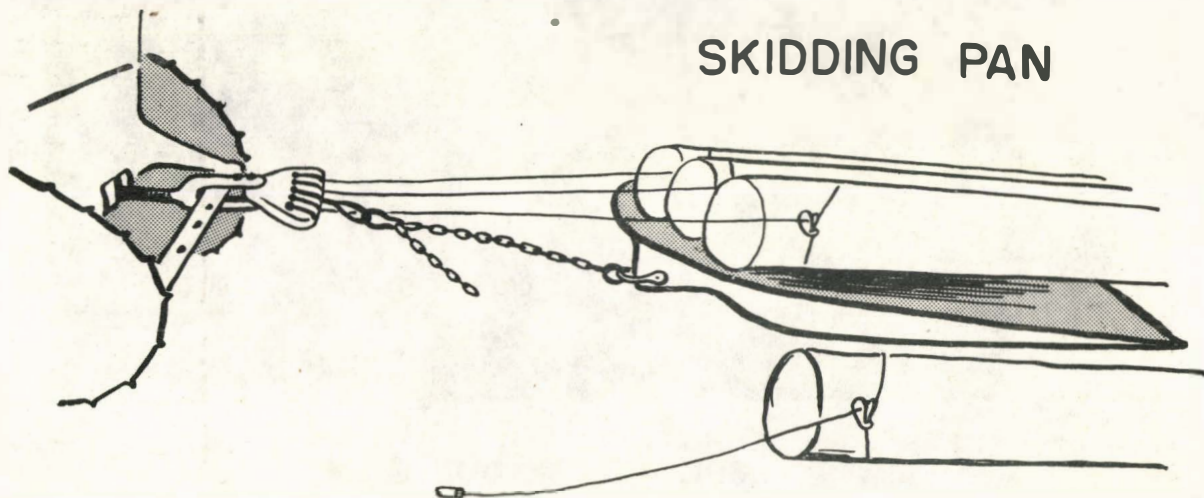
### Skidding with Pans

The anti-friction devices used behind a horse in ground skidding, such as the go-devil, the yarding sled or bogan, and the bumper, are usually not strong enough for use behind a tractor. Sturdier models have, with some success, been made for tractor use.

Better yet, however, is the steel skidding pan, built especially for use behind a tractor. This is merely a flat pan with a rounded up front end, made of boiler plate or some other hard metal. A chain is securely hitched to the middle of the front edge of the pan and to the tractor drawbar. Each log is pulled with a choker which is also hooked to the drawbar.



SKIDDING WITH SLED

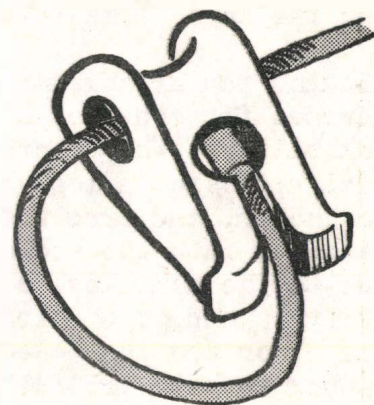


SKIDDING PAN



The choker is a short length of flexible steel cable. A sliding loop at one end goes around the pole or log and pulls tight, and a knob or spliced eye at the other end is attached to the tractor drawbar. The first chokers had a spliced eye on the end that goes around the log. Some of these are still in use. They are difficult to put on the log and wear out very quickly.

Home-made, or commercially made choker hooks of the conventional pattern are somewhat better. They can be put around the log more easily and if they are constructed properly they cause less wear on the standing part of the cable. These hooks, however, become disengaged rather easily - often resulting in loss of all or part of the skidding load. Time and energy are thus wasted in recovering the lost sticks.



**BARDON - WIRKKALA  
CHOKER HOOK**

One improved pattern of choker hook is the patented and commercially manufactured type illustrated here. The hook mechanism consists of a short sleeve which runs freely on the standing part of the choker cable. On one side of this sleeve there is a tapered recess into which a metal ferrule <sup>1/</sup>, attached to one end of the choker cable, can be firmly seated. Once in place and seated with a slight pull, there is almost no possibility that the ferrule will jump out of its seat. The inside of the sleeve through which the standing cable runs is carefully



**SKIDDING WITH PAN**

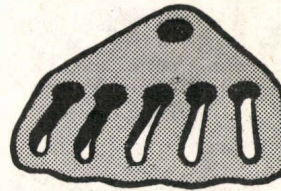
finished and rounded to reduce wear to a minimum. The whole device, including the ferrule, is made of a special type of tough and long-wearing steel. Soft metal will not work. For this reason it is highly inadvisable to try making a similar device in the camp blacksmith shop.

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<sup>1/</sup> Methods for attaching ferrules to the ends of cable and wire rope are discussed in Section 12.

In the illustration of the skidding pan a similar ferrule has been secured on the drawbar end of the choker cable. It engages in a specially constructed socket fastened to the tractor drawbar. Such sockets, with provisions for attaching up to 24 choker cables can be purchased from the same firms that make the hooks

Skidding pan arrangement, as illustrated provides for considerable efficiency and flexibility. The tractor driver can drive up beside a log, encircle it with the choker, and drop the other end of the cable into the socket, and then proceed to the next log, being sure that the front end of the log first hooked will roll up on the pan. He can repeat this operation until the pan or the drawbar socket, are full, and then proceed to the landing, where a slight backward movement of the tractor will permit ready disengagement of the chokers.



DRAWBAR HOOK

In some cases the pan is attached to a hoist at the back of the tractor to make possible lifting it when empty. This permits easier backing and maneuvering, and makes possible a quicker return trip.

The skidding pan still allows most of the log to drag in the dirt, however, and consequently results in dirty logs, and provides a lot of friction. The same disadvantage applies to bummers and sleds used for the same purpose.

### Skidding with Scoot

In northern New England a number of local industries, including wood turners, box board manufacturers and many of the sawmill men, are insistent that logs be brought to them clean and free from embedded gravel and dirt. To accomplish this the logs must be loaded on a sled or scoot at the position where they are dropped in the woods, and kept up off the ground throughout the logging operation. Loading these scoots in the woods is often a difficult job.

Illustrated on the opposite page is a loader invented and manufactured by a Massachusetts lumberman, A. E. Witherall of West Hampton. With it is shown Mr. Witherall's exceptionally sturdy and yet flexible scoot, so made that it can be backed up and maneuvered around in the woods.

The loader consists of a telescoping boom, made of extra heavy pipe, mounted on a tractor. This boom carries, on two sheaves, the 3/8" wire rope from a specially built winch up over the center of the scoot, where it is attached to a pair of loading tongs. The winch is a small one, developed for use in the oil fields. Instead of the relatively unresponsive jaw type clutch furnished with these winches Witherall uses a hydraulically operated brake from a motor car. The hydraulic cylinder is mounted beside the operator to give him finger tip control of its operation. When it is disengaged the winch is in free wheeling, and the cable can be drawn out to hook on a log 50 to 75 feet from the tractor. Two steel bars, weighing





WITHERALL LOG LOADER AND SCOOT

225 pounds, are hooked on to the radiator guard at the front of the tractor to help counterbalance the load to be lifted by the boom.

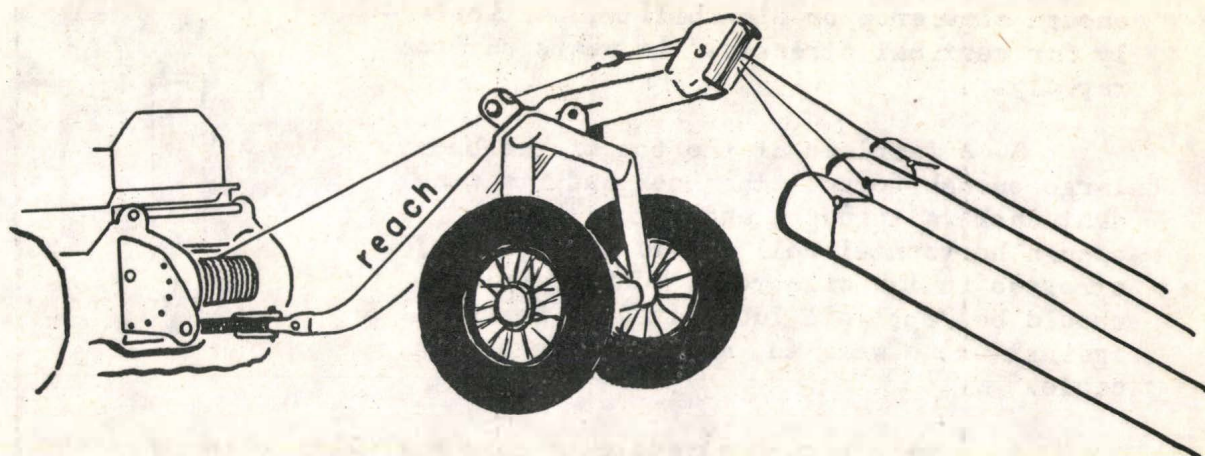
When traveling, the boom is telescoped merely by lifting a latch over the tractor driver's head and applying power on the winch. It is extended back to operating position by a cable and pulley arrangement, by turning the hand crank also mounted over the driver's head. This crank can be seen in the photograph.

#### Skidding with Tractor Arch

The best rig developed to date, for economical skidding, of long logs over rough terrain, is the tractor equipped with winch and arch. The arch is a development of the old high wheels used in the open pine forests of the South and West. It is much more sturdily constructed than the high wheels, and is much more flexible.

As shown in the illustration the arch is merely a big wishbone-like structure of steel mounted on wheels or crawler tracks. A reach from the top of the wishbone extends forward to the tractor hitch, and backward to form a boom ending in a pulley arrangement called the "Fairlead". The cable from the tractor winch, called the dragline, runs up the top of the reach, and through the fairlead. This fairlead allows logs or poles to be pulled in from the sides for bunching, and then, depending on size from one, to ten or fifteen, to be pulled up onto the arch for skidding to the road or yard.





LOGGING ARCH

During the past few years a number of arches have been built locally for use on Northeastern logging jobs. Considerable difficulty has been experienced with them which traces back largely to faults in design and materials. The requisites of a satisfactory arch, as illustrated above are:

1. Large diameter wheels -- four feet is about the minimum. Motor truck type wheels, most commonly used on home-made arches, are too small to negotiate the rocks, stumps and other obstacles in our northeastern woods successfully. Pneumatic mudgripper type tires are desirable. Commercial arches are provided with ten-ply tires, with four extra plies under the tread.



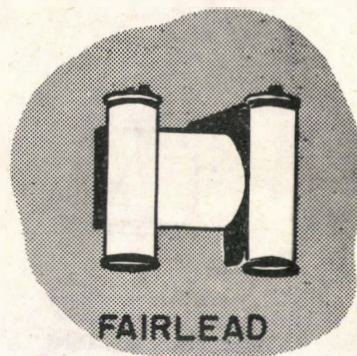
TRACTOR  
ARCH  
HITCH

2. A universal-joint type connection to the tractor, mounted higher than the tractor drawbar. A connection consisting merely of a pin



through the tractor drawbar does not provide enough clearance or flexibility, particularly for vertical stresses. It wears out too rapidly.

3. A fairlead at the top of the boom large enough to pull the hook and its pendant chokers through, and with a big enough horizontal roll not to cause undue stresses in the wire rope. This fairlead should be kept well lubricated to insure against undue wear to, and grooving by, the cable.



4. A wide enough straddle to give stability, both in travel, and in bunching logs from the side. Eight feet tread to tread, is about adequate.

5. A loop over the cable between the fairlead and the winch to keep the wire rope, should it break, from whipping around and hitting the tractor driver.

6. A high enough lift to keep the major part of the length of the logs being hauled off the ground, reducing friction and providing cleaner logs. Again, eight feet is about right.

The tractor, equipped with winch and arch is the most generally useful skidding device developed to date. In giant sizes it is making possible selective logging in the virgin timber on the Pacific Coast. In smaller timber it seems to be providing the answer to economical tree length logging. Within limits, and providing the trees are lying right, it can do its own bunching and it can bring in good-sized loads (one company is yarding up to  $2\frac{1}{2}$  cords of tree length poles per trip) over rough topography, with a minimum of damage and at a reasonable cost.



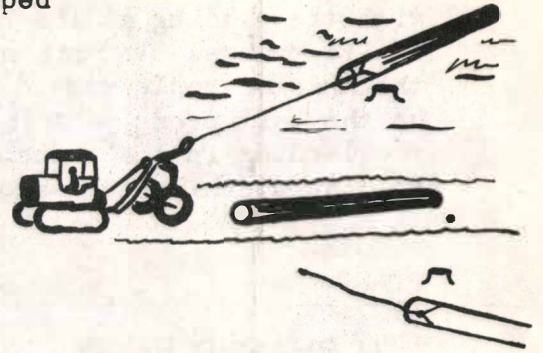
TREE LENGTH SKIDDING

#### Use of the Arch

The most important factor in efficient use of an arch in the woods is to make sure that the trees are felled in the right direction for easy



haul. As explained in the section on felling, this usually means dropping them at a  $30^{\circ}$  to  $45^{\circ}$  angle to the road, away from the direction in which they are to be hauled out. If they are dropped in this manner, the choker setter can roll them from behind stumps or other obstructions, attach the chokers, and when the tractor and arch come in for the load they can be quickly and easily twitched to the road. On some operations it has proved more economical to have horses or a smaller tractor bunch the arch loads at the side of, or in the tractor road. This might be the case in unusually rugged rocky country, where tractor roads are difficult or expensive to make, or where extra heavy tractors are being used on long hauls. Usually it is more economical to place the tractor roads close enough together so that the tractors can do their own bunching, and to lay the trees so that they can be dragged out most easily.



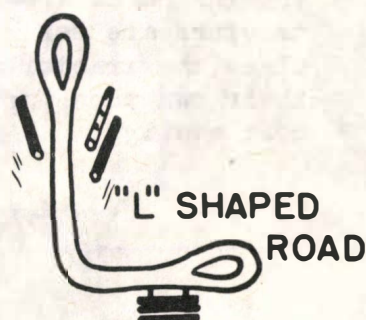
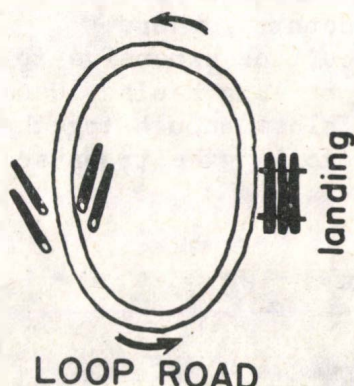
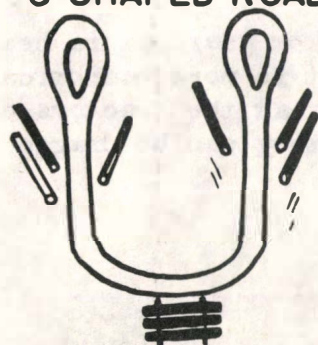
### SKIDDING WITH PULPWOOD ARCH

Another important factor in economical use of the tractor and arch is to make the roads as straight as possible and reduce the number of turn-arounds to the minimum. This can frequently be done by making a loop



road, with the tractor travelling straight across the landing, only pausing to drop its load, and then making a circuit back into the woods to pick up another load. Another possibility is a U shaped road, with the landing at the bottom of the U and a loop at the end of each of its prongs. In this case a load would be picked up on the right prong, the tractor would come down the base of the U, drop its load and proceed up the left prong to turn around, pick up another load, coming back to the landing in the opposite direction. The more conventional L shaped road should have turn-around loops at either end.

"U" SHAPED ROAD



#### Experimental Tractors Developed by the Forest Service

Two new light tractors which may be of value in light skidding and for bunching loads in the woods, have recently been developed in the equipment laboratory of the Forest Service. <sup>1/</sup> One of these has a 20 horsepower gasoline motor, 9" track treads, a 35" straddle, and weighs only 4600 pounds. It was used in great numbers as an airborne unit by the U. S. Army during the war for repairing and building airports in inaccessible locations where all machinery had to be flown in. It is soon to be available as a commercial unit, and it seems ideal for bunching of small and medium sized logs and for skidding of such products as white birch turning wood, and a great deal of our pulpwood and distillation wood. An even smaller tractor, the "Trail Beetle", developed by the same laboratory, has a 10 HP motor and weighs only 1500 pounds. It will probably also be available commercially in the near future.

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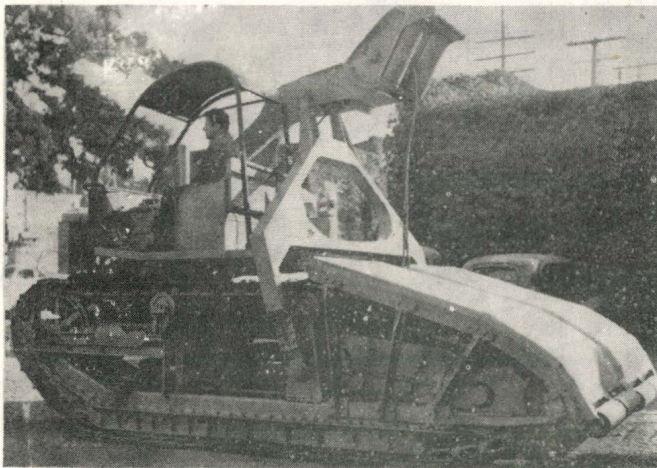
<sup>1/</sup> Located in Portland, Oregon





### U.S.F.S. "TRAIL BEETLE" and "AIRBORNE" TRAIL TRACTOR

The Equipment Laboratory has also constructed an experimental logging tractor which has become known as the "Tomcat". This is a special crawler-type tractor with an arch built on top. It is much more maneuverable, has more traction in mud or snow, and is better able to yard in big logs from the side than any commercially built outfit to date. This logging tractor and arch combination so far has been built in only a giant size (23 tons) suitable for West Coast logging, and has not yet been put out by any commercial producer. It is believed that a smaller size "Tomcat" would find a wide field of usefulness, not only in the Northeast but also in the South, the Lake States, and even in the West, and efforts are being made to get one designed and put on the market.



U.S.F.S. TOMCAT LOG TRACTOR



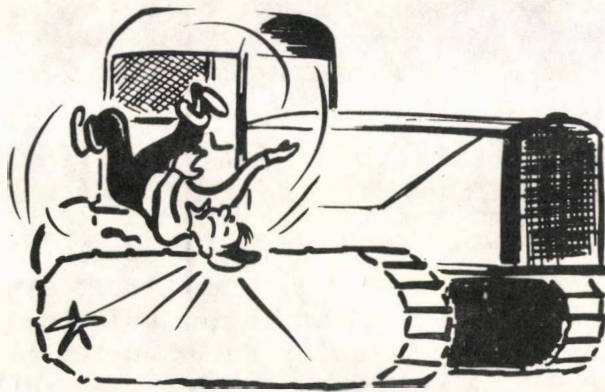
TOMCAT LOGGING WESTERN PINE



## Safety in Tractor Driving

A tractor driver, even of one of the smaller models, has a lot of weight and power under his control. If all this weight and power is not properly controlled it can easily cause serious injury to men working around it, or to the operator himself. It is highly important that the operator be a sober, careful, and trustworthy worker, and that the men working around the machine exercise reasonable care.

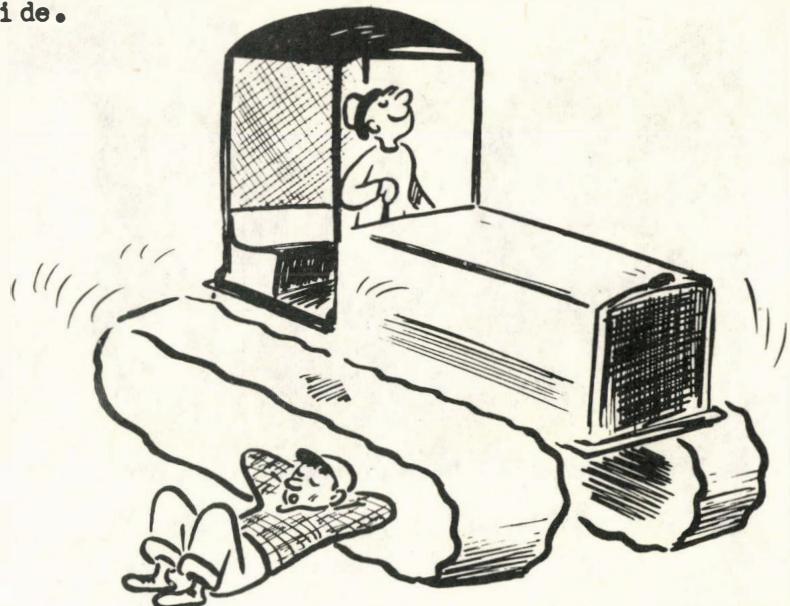
Many serious accidents occur in getting on the machine. Mud, ice and snow collect on the tracks and decks of tractors working in the woods. They provide enough of a hazard. But a careless operator or grease monkey may let grease or oil accumulate there too. A slip, resulting in a fall against one of the steel surfaces or corners on the machine can easily result in serious injury or even death. A hand hold is provided



SLIPS GETTING ON  
THE MACHINE  
MAY BE SERIOUS.

on most tractors to make mounting easier. It should be used. The tractor operator should never wear shoes with steel plates, or caulks on the soles. They are as dangerous on a steel deck as is ice. The operator, or any other workman, should never ride anywhere on the tractor except on the seat.

Most operators will mount their machine from the left side. Before starting up they should be sure that there are no obstacles, or that no one is sleeping, on the right hand side.



LOOK ON OTHER SIDE  
OF MACHINE  
BEFORE STARTING



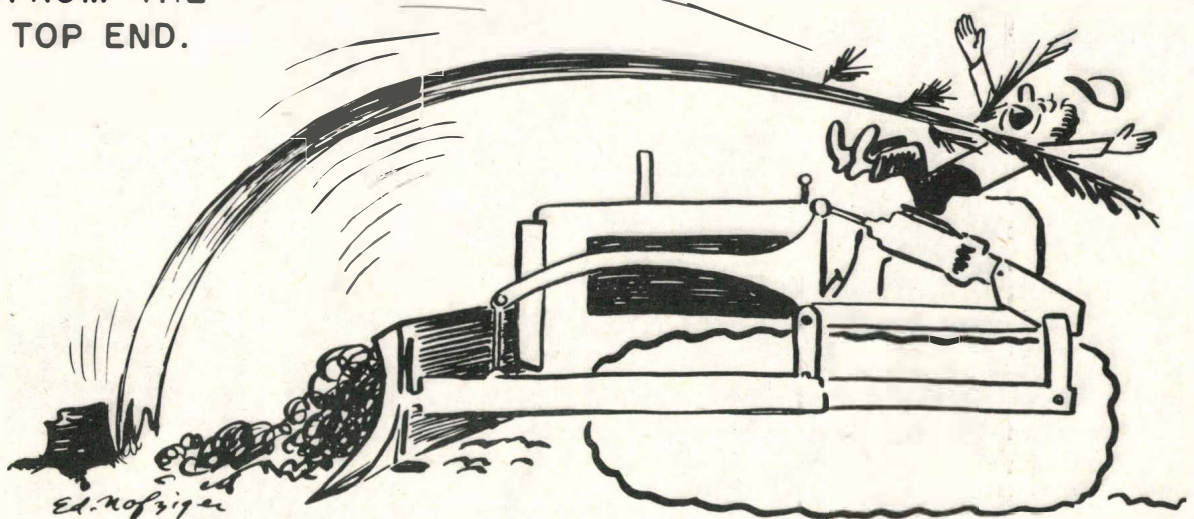
One of the greatest dangers in operating a tractor in the woods is from limbs, or even sections of the trunk, falling from trees bumped by the tractor, its blade, or its load. The guards discussed earlier in this section are designed to reduce this hazard, but the best of them cannot stand up against some of the bigger chunks that may be knocked loose. A chunk from a dead tree may weigh a ton or more. Such trees should be pulled over with a cable, rather than pushed over with the blade, or the bumper. And all such trees along traveled routes, around skidways, and along main skidroads should be brought down. Often a sharp gust of wind will bring a chunk hurtling down on the workmen below.

The greatest hazard in the operation of the machine itself is side slipping. The danger is not in the slipping itself, but in the slipping tracks coming up against a stump or a projecting rock, and upsetting the machine. The widest wheelbase tractor obtainable should be used in woods work in hilly country. Even with such a machine the operator should attempt to go directly across a slope only when it cannot be avoided. Usually he can plan his route so as to travel quartering up or down the slope.

Even when quartering on a side hill he should be alert to the danger of side slipping, and be ready to turn the tractor either up or down the hill whenever it starts to slip. His grouzers have a chance to control a tractor sliding "end to", and the chances of upsetting a machine in this predicament are very much less. A tractor slipping sideways hasn't a chance.

Another hazard occurs in bulldozing tree stems to clear a campsite, a landing or a road. Wherever possible this bulldozing should be done from the butt end of the downed trees. When such trees are pushed from their tops many of them will bow up, and then suddenly let loose like a catapult. Many a tractor driver has "jill poked" himself in this way.

### DON'T BULLDOZE TREES FROM THE TOP END.



In hooking on an arch, or any other piece of equipment, the tractor operator has the life of the hookup man in his hands. The weights of the two pieces of equipment, and the power involved, make this one of the most dangerous operations in the woods.

The hookup man should, if possible, be out away from the space between the two machines. He can prop the tongue of the arch up with a "Dutchman" or a block at about the right height, and then complete guiding the hitch to its proper position with a pry pole or bar. Above all he should not try to guide it with his hands. The tractor operator should back his machine in its lowest gear, and at about half throttle, slowly and carefully. The wheels of the arch should be blocked, both fore and aft, while hitching on.

Woodsmen have always had to handle heavy weights and brute force in tremendous quantities, under adverse conditions. The introduction of the tractor has increased these hazards, and placed even more of a premium on the intelligent, alert, and "catty" logger.



Some Manufacturers of Tractors and Tractor Equipment

Used in Logging in the Northeast.

Tractors

Allis-Chalmers Mfg. Co., Tractor Div., Milwaukee, Wisc. (Crawler & Wheeled)

Caterpillar Tractor Co., Peoria, Ill. (Crawler)

Cletrac-Oliver Tractor Co., Cleveland 17, Ohio. (Crawler & Wheeled)

Ford Motor Co., Detroit, Mich. (Wheeled)

International Harvester Co., 180 No. Mich. Ave., Chicago, Ill. (Crawler & Wheeled)

Linn Manufacturing Co., Morris, N. Y. ("Haftraks")

Minneapolis-Moline Power Implement Co., Minneapolis, Minn. (Wheeled)

John Deere Implement Co., Moline, Ill. (Wheeled)

Winches and Arches

Isaacson Iron Works, Seattle, Washington.

Pacific Car and Foundry Co., Renton, Washington.

Willamette-Hyster Company, Peoria, Ill.

Skidding Pans

Electric Steel Foundry, 2141 N. W. 25th Ave., Portland, Oregon.

Young Iron Works, Seattle 4, Washington